

**ABSTRACT OF THE DISCLOSURE**

An engine is operated in accordance with a plurality of operation modes obtained by combining one of a 4-cycle mode and a 2-cycle mode with one of a  
5 combustion ignition control where an ignition is performed with an ignition unit and a self ignition priority control including the ignition performed without the ignition unit. Upon switching of the operation mode, a transition cycle is performed once between a first operation mode before switching of the operation mode and a second operation mode after switching of the operation mode. Timing for operating an intake valve or  
10 an exhaust valve in the transition cycle is different from that in the second operation mode. The combustion ignition control is executed in one of the combustion chambers where the single operation of the transition cycle is completed until a single cycle of each transient cycle in the rest of the combustion chambers is terminated.